

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER

ZAHFRI P369US

U.S. APPLICATION NO. 37 CFR 1.47(b)

09/936477

INTERNATIONAL APPLICATION NO.

PCT/EP00/02337

INTERNATIONAL FILING DATE

March 16, 2000

PRIORITY DATE CLAIMED

March 22, 1999

TITLE OF INVENTION

AUTOMATIC TRANSMISSION FOR MOTOR VEHICLES

APPLICANT(S) FOR DO/EO/US

Bülent KORKMAZ, Walter KUHN, Hans-Jörg DOMIAN, Bernhard DRERUP and Gerhard GUMPOLTZBERGER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.

2. This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.

3. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 a. is transmitted herewith (required only if not transmitted by the International Bureau).
 b. has been transmitted by the International Bureau. (PCT/IB/308 mailed 28 September 2000).
 c. is not required, as the application was filed in the United States Receiving Office (RO/US)

6. A translation of the International Application into English (35 U.S.C. 371(c)(2)) is attached.

7. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 a. are transmitted herewith (required only if not transmitted by the International Bureau).
 b. have been transmitted by the International Bureau.
 c. have not been made; however, the time limit for making such amendments has NOT expired.
 d. have not been made and will not be made.

8. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. An Information Disclosure Statement under 37 CFR 1.97 and 1.98 with PTO FORM 1449.

12. An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. A FIRST preliminary amendment.
 A SECOND or SUBSEQUENT preliminary amendment.

14. A substitute specification.

15. A change of power of attorney and/or address letter.

16. Other items or information:
 Preliminary Examination Report
 Annexes to Pre. Ex. Rep.
 International Search Report
 German Novelty Search Report
 15 copies of citations
 Form PCT/IB/308
 International Publ. No. WO 00 57082 (Face page only)
 Copy of Request
 Submission of Formal Drawings
 3 sheets of formal drawings
 Abstract
 German Language Specification
 Marked-Up Version of Specification

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date September 13, 2001 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL918841235US addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Anthony G. M. Davis

(typed or printed name of person mailing paper)


 (signature of person mailing paper)

PATENT & TRADEMARK OFFICE



020210

17. The following fees are submitted:

				CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO				531 Rec'd P	13 SEP 2001
International preliminary examination fee paid to USPTO (37 CFR 1.482)				\$60.00	
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).				\$690.00	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO				\$710.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)(4)				\$1000.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =				860	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				0	
Claims	Number Filed	Number Extra	Rate		
Total Claims	10 - 20 =	0	x \$18.00	0	
Independent Claims	1 - 3 =	0	x \$80.00	0	
Multiple dependent claim(s) (if applicable)			+ \$270.00	0	
TOTAL OF ABOVE CALCULATIONS =				0	
Reduction by 1/2 for filing by small entity, if applicable. Applicant claims Small Entity Status . (Note 37 CFR 1.9, 1.27, 1.28).				0	
SUBTOTAL =				860	
Processing fee of \$130.00 for furnishing the English translation later the <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				0	
TOTAL NATIONAL FEE =				0	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+ 40	
TOTAL FEES ENCLOSED =				900	
Amount to be: refunded \$ charged \$					

a. A check in the amount of **\$ 900.00**, to cover the above fees is enclosed.

b. Please charge my Deposit Account No. 04-0213, in the amount of \$____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-0213. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Anthony G.M. Davis
Anthony G.M. Davis - Registration No. 27,868
Davis & Bujold, P.L.L.C.

Fourth Floor
500 North Commercial Street
Manchester, NH 03101-1151
Telephone (603) 624-9220
Telefax (603) 624-9229

PATENT & TRADEMARK OFFICE



020210

09/13/01

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Bülent KORKMAZ, Walter KUHN,
Hans-Jörg DOMIAN, Bernhard DRERUP and
Gerhard GUMPOLTSBERGER
Serial no. :
For : AUTOMATIC TRANSMISSION FOR MOTOR
VEHICLES
Docket : ZAHFRI P369US

BOX PCT

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

FIRST PRELIMINARY AMENDMENT

Dear Sir:

By way of preliminary amendment, please amend the above identified application as set forth below.

In the Specification:

Please cancel paragraphs 2, 4, 5, 8, 9, 18, 19 and 29 of the specification, in their entirety, in favor of a clean form of paragraphs 2, 4, 5, 8, 9, 18, 19 and 29 of the specification, without any markings thereon, as follows. Also accompanying this response is a copy of the original paragraphs of the specification which show the addition(s) (by underlining, shading and bold) and the deletion(s) (by strikeout) to the canceled specification paragraphs. Please enter the replacement specification paragraphs into the record of this case.

In the Claims:

Please cancel claims 1-10, without prejudice or disclaimer of the subject matter therein, in favor of new claims 11-20 as follows.

TUE TR 60 12/10/2001

[002] FIELD OF THE INVENTION

[004] BACKGROUND OF THE INVENTION

[005] A planetary transmission of this nature has been made known by United States Patent No. 4,070,927, wherein the number of the forward gears is respectively greater by one than the numbers of the frictional elements. At each gear change between the forward gears, one of the provided frictional elements is shifted in or out.

[008] In accordance with the invention, this purpose will be achieved by a transmission for a motor vehicle with automatic shifting capabilities.

[009] SUMMARY OF THE INVENTION

[018] BRIEF DESCRIPTION OF THE DRAWINGS

[019] The invention will now be described, by way of example, with reference to the accompanying drawings in which:

[029] DETAILED DESCRIPTION OF THE INVENTION

11. (NEW) A transmission (1), with capability of automatic shifting, for a motor vehicle said transmission having three spider planet sets (2, 3, 4), wherein the first set, is on the entry side, the third set is on the exit side and the second set is located between the first and the second set, the said transmission possessing three brakes (5, 6, 7) and two clutches (8, 9) for the shifting of six forward gears and one reverse gear, and having further one input shaft (10) and one output shaft (11) with the following combinations:

the input shaft (10) is connected directly with the sun gear (16) of the second planetary set (3) and

the input shaft (10) is connectable by means of the first clutch (8) with the sun gear (12) of the first planetary set (2) and connectable with the spider (15) of the first planetary set (2) by means of the second clutch (9) and

the sun gear (12) of the first planetary set (2) is connectable with the housing of the transmission (1) by means of the first brake (5), and

the spider (15) of the first planetary set (2) is connectable with the housing of the transmission by means of the second brake (6), and

the sun gear (20) of the third planetary set (4) is connectable with the transmission housing by means of the third brake (7),

therein characterized, in that the output shaft (11) is continually connected with the spider (19) of the second planetary set (3) and is continually connected with the internal gear (14) of the first planetary set (2).

12. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the spider (15) of the first planetary set (2) is continually connected with the internal gear (22) of the third planetary set (4) and the internal gear (18) of the second planetary set (3) is continually connected to the spider (23) of the third planetary set (4).

13. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11 wherein the first clutch (8) is activated in the third and fifth gear, as well as in the reverse gear.

14. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the second clutch (9) is activated in the fourth, fifth and sixth gear.

15. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the first brake (5) is activated in the second and sixth gear.

16. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the second brake (6) is activated in the first gear and in the reverse gear.

17. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the third brake (7) is activated in the first, second, third and fourth gear.

18. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the first brake (5) is activated in the second and sixth gear.

19. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the second brake (6) is activated in the first gear and in the reverse gear.

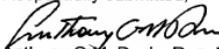
20. (NEW) The motor vehicle transmission with automatic shifting capability according to claim 11, wherein the third brake (7) is activated in the first, second, third and fourth gear.

REMARKS

Accompanying this response, please find replacement paragraphs and marked-up paragraphs of the specification which overcome some informalities noted in the specification on file. The undersigned avers that the enclosed replacement paragraph(s) of the specification do not contain any new matter.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



Anthony O.M. Davis, Reg. No. 27,868
Customer No. 020210
Davis & Bujold, P.L.L.C.
Fourth Floor
500 North Commercial Street
Manchester NH 03101-1151
Telephone 603-624-9220
Facsimile 603-624-9229
E-mail: patent@davisandbujold.com

13 SEP 2001

[001] AUTOMATIC TRANSMISSION FOR MOTOR VEHICLES 531 Rec'd PCW 13 SEP 2001
[002]

[003] The present invention concerns a motor vehicle transmission capable of automatic shifting, with three spider mounted, planetary sets, three braking mechanisms, two couplings for six forward gear changes and one reverse gear change as well as one input drive shaft and one output drive shaft.

[004] A planetary transmission of this nature has been made known by US 4,070,927, wherein the number of the forward gears is respectively greater by one than the numbers of the frictional elements. At each gear change between the forward gears, one of the provided frictional elements is shifted in or out.

[005] Automatically shifting vehicle transmissions for motor vehicles, which are made in planetary construction, have already been described in the state of the technology many times and are subject to ongoing development and improvement. Thus, these transmissions should possess a sufficient number of forward gears as well as one gear for reverse. Further, the said transmissions should have a gear ratio very well adapted to motor vehicles with a high over-all range as well as favorable intervening stages. Further, these should make possible a high start-up gear ratio in the forward direction and make available a direct drive advantageous for installation in both passenger cars as well as in commercial vehicles. Besides this, these transmissions should require small expenditure in manufacturing expense and especially favorable, is that they require a small number of shifting components. Advantageously, double shifting is avoided in sequential shifting, so that in the case of shifting within particular gear groupings, only one shifting component is changed.

[006] Thus, the purpose of the invention is to make available a new and improved transmission, which avoids the known faults and yet fulfills the above mentioned advantages. Further the purpose will include a desirable construction and arrangement of a start-up element as well as make possible a desirable design of the input and output of power.

[007] In accord with the invention, this purpose will be achieved by a transmission for a motor vehicle with automatic shifting capabilities of the type mentioned in the introductory passages with the features of Claim 1.

[008]

[009] The automatically shiftable transmission for a motor vehicle with three spider mounted planet gears, three brakes and two clutches, assembled to shift into six forward gears and one reverse gear is so designed, that the drive shaft is connected directly with the sun gear of the second planetary set, and that the input drive shaft, by means of the first clutch, can be connected with the sun gear of the first planetary set and/or by the second clutch with the spider of the first planetary set. In addition, or alternatively, the sun gear of the first planetary set, by means of the first brake is connectable with the housing of the transmission and/or the spider of the first planetary set. By means of the second brake, the said sun gear can be connected with the said housing, and/or the sun gear of the third planetary set can be connected by the third brake with the housing.

[010]

In this way, an automatically shiftable vehicle transmission is available, with six forward gears, and one reverse gear which, advantageously for motor vehicles, exhibits a very well adapted gear ratio with a high over-all range and favorable gear change stages, as well as a high start-up ratio in the forward direction. Further the fifth gear is a direct gear. A transmission of this nature is adaptable both for passenger vehicles and for commercial vehicles and characterizes itself by a modest cost of construction, that is, two clutches and three brakes, wherein, in the case of sequential shifting, double shift is avoided and thus, with any desired shifting within a group of gears, respectively only two shifting elements are changed.

[011]

The transmission in accord with the invention can be made in an advantageous manner in two versions, wherein these versions differ from one another by the varying connections within the individual planetary sets. In the first version, provision is made, that the power take-off shaft is continually connected to the spider of the third planetary gear set and with the internal gear of the first planetary set. Provision is further made, in that the spider of the first planetary set is continually connected to the internal gear of the second planetary set and the spider of the second planetary set is continually connected with the internal gear of the third planetary set.

[012] The power input drive shaft and the power output drive shaft can, in this design, be coaxial with one another on opposite sides of the transmission housing as well as on the same side of the said transmission housing. Further, a placement of the power takeoff drive between the planetary sets and the clutches is possible.

[013] In a development in accord with a second version: the power takeoff drive is continually in connection with the spider of the second planetary set and with the internal gear of first planetary set; the spider of the first planetary set is continually in connection with internal gear of the third planetary set 4 , and the internal gear of the second planetary set is continually in connection with the spider of the third planetary set. A design of this kind is especially well adapted for a coaxial arrangement of power input and power take-off shafts.

[014] A development of the invention proposes, that the first clutch be activated in the first and fifth gear, as well as the reverse gear, and that the second clutch is activated in the fourth, fifth and sixth gear.

[015] The first brake is activated in the second and sixth gear, the second brake is available for the first and reverse gears and the third brake is activated in the first, second, third and fourth gear. In this way, the achievement is advantageously made, that each time, only one shifting element for each optional shift between the first and the fourth gear, between the third and fifth gear and between the fourth and sixth gear is changed. Thus, when sequential shifting is carried out, double shifting is avoided.

[016] Further goals, features, advantages, and application possibilities of the invention are made known from the following description of an embodiment example, which is more closely detailed by reference to the drawings.. In this way, all described and/or illustrated features, of themselves, or in optional, advantageous combination, form the object of the invention, independently from their condensation in the claims and the inter-references of said claims.

[017]

[018] There is shown in:

- [019] Fig. 1 in schematic presentation, a transmission with coaxial power input and output in accord with a first version,
- [020] Fig. 2 in schematic presentation, a transmission with coaxial power input and output in accord with a second version,
- [021] Fig. 3 in schematic presentation, a transmission in accord with the first version with the power input on the power output side,
- [022] Fig. 4 in schematic presentation, a transmission in accord with the first version, with power output between the planetary sets and the clutches,
- [023] Fig. 5 in schematic presentation, a transmission with a torque converter for a standard transmission assembly,
- [024] Fig. 6 in schematic presentation, a transmission in accord with the first version, however, in mirror image arrangement with integrated start-up braking for a front-cross-arrangement in passenger car,
- [025] Fig. 7, 8, 9 example series of gear ratios for a transmission in accord with Fig. 1,
- [026] Fig. 10, 11 example series of gear ratios for a transmission in accord with Fig. 2, and
- [027] Fig. 12 a flow diagram for a transmission in accord with the invention.
- [028]
- [029] A transmission (1) (Fig. 1) in accord with the invention is essentially comprised of the spider mounted planetary sets 2, 3, 4 as well as the brakes 5, 6, 7 together with the two clutches 8 and 9. The planetary sets are composed of respectively, a sun gear, a spider support system with planetary gears as well as an internal gear, which sets essentially can be assembled in two different versions. In a first version, the planetary sets are assembled together as follows: the input drive shaft 10 is continually connected to the sun gear 16 of the second planetary set 3. This input drive shaft 10 can be connected, by means of the first clutch 8, with the sun gear 12 of the first planetary set 2 and the said input drive shaft 10, by means of the second clutch, 9 can be connected to the spider of the first

planetary set 2 and to the internal gear 18 of the planetary set 3. This input drive shaft 10 is arranged to be coaxial to the power output shaft 11.

[030] The internal gear 14 of the first planetary set 2 stands continually in connection with the spider 23 of the third planetary set 4 and, in turn, this spider 23 is continually in connection with the power output shaft 11. The following components can be braked against the transmission housing: the sun gear 12 of the first planetary set by means of the first brake 5, the spider 15 of the first planetary set 2 by means of the second brake 6, the internal gear 18 of the second planetary set 3 also by means of the second brake 6, and the sun gear 20 of the third planetary set 4 by means of the third brake 7.

[031] The same components in different Figures or components with the same function are provided with the same reference numbers.

[032] In a further development in accord with the second version of the invented transmission (Fig. 2), again with coaxial input and output drive shafts, respectively 10, 11, the planetary sets 2, 3, 4, the brakes 5, 6, 7 as well as the couplings 8 and 9, essentially, are arranged as before as was shown in Fig. 1. However, this second version differentiates itself from the first version by the means of the interconnection of the individual components.

[033] Thus in this case, the sun gears 12 and 16 of the first and second planetary sets can likewise be connected with, or be in continual connection with the input drive shaft. The power output shaft 11, on the other hand, is in continual connection with the spider 19 of the second planetary set 3 and this, in turn, is in continual connection with the internal gear 14 of the first planetary set 2. The spider 15 of the first planetary set 2 is further continually connected with the internal gear 22 of the third planetary set 4 and the internal gear 18 of the second planetary set 3 is continually connected to the spider 23 of the third planetary set 4. The spider 15 as well as the internal gear 22 can be, in this way, by means of the brake 6, attached to the transmission housing, as can the sun gear 20 by means of the brake 7.

[034] The design of the transmission in accord with Fig. 3, represents, essentially, the first version shown in Fig. 1. In this case, however, the alternative is, that the

input drive 10 and the output drive 11 are provided on the same side of the transmission.

[035] A further alternative arrangement of the transmission is shown in Fig. 4, wherein the input power sequences through the transmission by means of the input drive 10 to the sun gear 16 and simultaneously through the clutches 8 and 9 to the sun gear 12 as well as to the spider 15 which connects to the internal gear 18. The output drive 11 is placed in the transmission between the planetary sets 2, 3, 4 and the clutches 8 and 9.

[036] A development of the transmission arrangement based on the first version (Fig. 5), provides, that the input drive be made through a torque converter 24. The turbine wheel of the torque converter 24 is directly connectable with the sun gear 16 of the second planetary set 3, or is connectable by means of the clutches 8 and 9 with the first or second planetary set 2, 3.

[037] A further alternative arrangement of the invented transmission is presented in Fig. 6, showing an integrated start-up brake for a front-end, cross motor setup in a passenger car. The transmission in this case corresponds to a mirror image design of the first version of the transmission as shown in Fig. 1, wherein, however, the input and output drive shafts 10 and 11 respectively, are placed on the same side. Additionally, between an internal combustion engine 25 and the input drive shaft 10 is found a torsion, vibration damper 26. The power output shaft 11 is, by means of an additional gear ratio stage and a differential 27, connected to the drive wheels 28 and 29.

[038] From Figs. 7, 8, 9, the examples of gear ratio series for the invented transmission in accord with Fig. 1, it may be seen, that the gear ratio i in the first gear lies between 4.84 and 5.70, and the entire stage range ϕ_{ges} lies between 6.32 and 7.34. The ratio i in the fifth gear is always 1.

[039] For a transmission in accord with Fig. 2, the two examples of gear ratio series (Figs. 10, 11), exhibit a ratio i in the first gear between 3.83 or 3.87 at an entire stage range ϕ_{ges} of 4.88 to 5.06. The ratio i in the fifth gear shows likewise 1.00. The fifth gear is, in all ratio series, is designed advantageously as direct gear.

[040] From the flow diagram of shifting in accord with the presentation of Fig. 12, it may be seen that in the case of sequential shifting, double shifting is avoided, since two neighboring gear stages always employ one switching element in common. From this flow diagram in Fig 12, one can also see, that in the case of any optional shifting between the first and fourth gears, as well as between the fourth and sixth gears, at any time, only one switching element is activated. The shift position of a braked neutral is possible through the activation of the brakes B1 and B2, whereby a blockage of the output drive is made and a simultaneous, defined speed of rotation can be achieved in the transmission, possibly useful for a hill-holding function.

[041] At the same time, free wheeling at each position of the transmission can be brought about, thus, for instance, between the shaft and the housing, or between two shafts, in order to divide one shaft into two. A neutral position can be effected by the closure of one shifting element and the opening of another, for instance, by closing the first brake 5 and opening the second brake 6 for a neutral position forwards.

[042] Further, the input drive shaft 10 can be separated from the motor by a clutch element, whereby the clutch element, for instance, can be designed as a dry or wet start-up clutch, a magnetic powder clutch, a centrifugal, a hydrodynamic clutch or a similar clutch device. Further, the input drive shaft 10 can also be separated from the motor by means of a conversion element, wherein this may be designed as a hydrodynamic converter, as a differential converter, as a start-up retarder, as a hydrostatic transmission, or an electrical transmission or again as an electrodynamic clutch.

[043] Further, the input drive shaft 10 can also be separated from the motor by a conversion element, wherein this could be designed as a hydrodynamic converter, as a differential converter, as a start-up-retarder, as a hydrostatic transmission, as an electrical transmission or as an electro-mechanical transmission or the like. This means, that between the motor and the drive, an additional ratio stage with a constant or even a variable ratio which was equal to or greater than one.

[044] Alternatively, a start-up element can also be placed behind the drive, so that the input shaft 10 is firmly bound with the clutch shaft of a motor. In such a case, the start-up is carried out by a shifting element of the transmission, for instance, by means of the second brake 6.

[045] In addition a slip-free brake, for instance a hydraulic or electrical retarder or the like, can be placed on each shaft, preferably on the input shaft 10 or the output shaft 11.

[046] Also a power takeoff shaft can be provided for the input power from additional components on each shaft, preferably, however, on the input shaft 10 and the output shaft 11.

[047] The shifting elements themselves comprise powershift clutches or brakes, such as lamellar clutches, band brakes, conic clutches or the like.

[048] The shifting elements can, however, be made of form-fit clutches or brakes, for instance dog clutches or synchronization.

Claims

Claimed is:

1. A motor vehicle transmission with automatic shifting capability having three spider carried planetary sets, three brakes, and two clutches for shifting through six forward gears and one reverse gear, and having an input drive shaft and an output drive shaft therein characterized, in that

- the input drive shaft (10) is connected directly with the sun gear (16) of the second planetary gear set (3) and
- the input drive shaft (10) is connected by means of the first clutch (8) with the sun gear (12) of the first planetary set (2) and/or by means of the second clutch (9) can be connected with the spider (15) of the first planetary set (2), and/or
- the sun gear (12) of the first planetary set (2) can be connected to the housing of the transmission by means of the first brake (5), and/or
- the spider (15) of the first planetary set (2) can be connected with the transmission housing by means of the second brake (6), and/or
- the sun gear (20) of the third planetary set (4) can be connected with the housing by means of the third brake (7).

2. A motor vehicle transmission with automatic shifting capability, in accord with Claim 1, therein characterized, in that the output shaft (11) is continually in connection with the spider (23) of the third planetary set (4) and with the internal gear (14) of the first planetary set (2).

3. A motor vehicle transmission with automatic shifting capability, in accord with Claim 2, therein characterized, in that the spider (15) of the first planetary set (2) is in continual connection with internal gear (18) of the second planetary set (3) and the spider (19) of the second planetary set (3) is in continual connection with the internal gear 22 of the third planetary set (4).

4. A motor vehicle transmission with automatic shifting capability, in accord with Claim 1, therein characterized, in that the output shaft (11) is in continual connection with the spider (19) of the second planetary set (3) and with the internal gear (14) of the first planetary set (2).

T03760-24795660

5. A motor vehicle transmission with automatic shifting capability, in accord with Claim 4, therein characterized, in that the spider (15) of the first planetary set (2) is in continual connection with the internal gear (22) of the third planetary set (4) and the internal gear of the second planetary set (3) is in continual connection with the spider (23) of the third planetary set (4).

6. A motor vehicle transmission with automatic shifting capability, in accord with one of the foregoing Claims, therein characterized, in that the first clutch (8) is activated in the third and fifth gear, as well as in the reverse gear.

7. A motor vehicle transmission with automatic shifting capability, in accord with one of the foregoing Claims, therein characterized, in that the second clutch (9) is activated in the fourth, fifth and sixth gear.

8. A motor vehicle transmission with automatic shifting capability, in accord with one of the foregoing Claims, therein characterized, in that the first brake (5) is activated in the second and sixth gear.

9. A motor vehicle transmission with automatic shifting capability, in accord with one of the foregoing Claims, therein characterized, in that the second brake (6) is activated in the first gear and in the reverse gear.

10. A motor vehicle transmission with automatic shifting capability, in accord with one of the foregoing Claims, therein characterized, in that the third brake (7) is activated in the first, second, third and fourth gear.

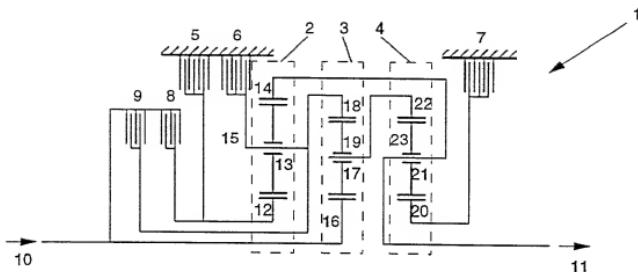


Fig. 1

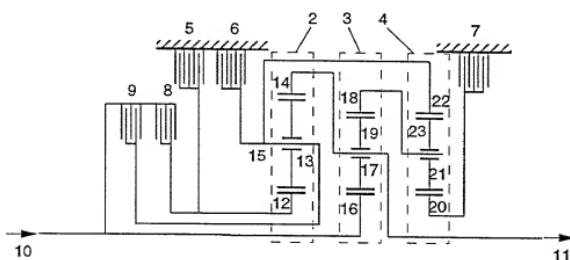


Fig. 2

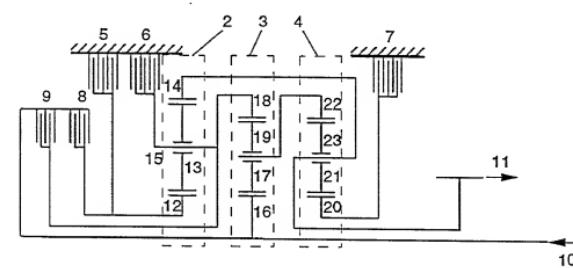


Fig. 3

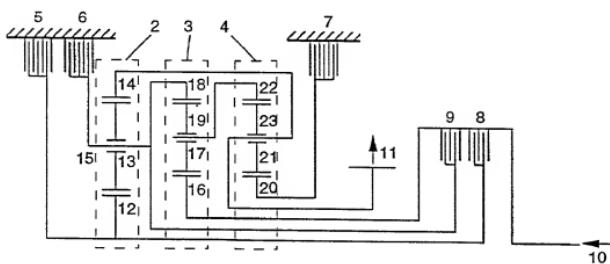


Fig. 4

2 / 3

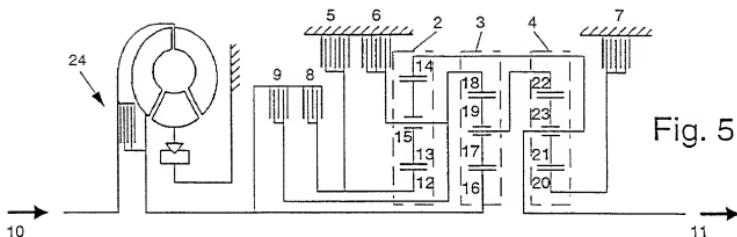


Fig. 5

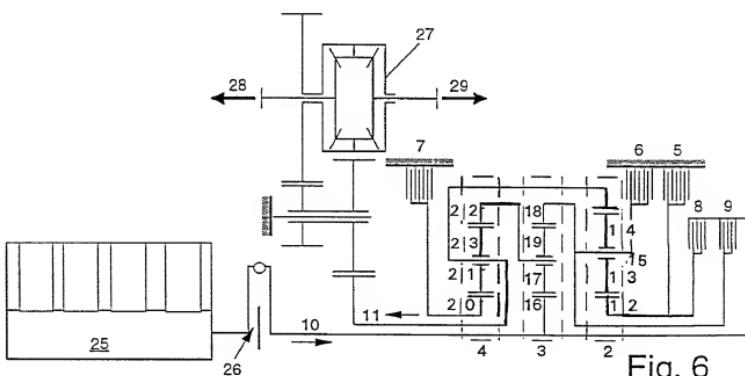


Fig. 6

	1. Gear	2. Gear	3. Gear	4. Gear	5. Gear	6. Gear	R Gear	φ_{ges}
i	5,70	3,33	1,98	1,41	1,0	0,78	-3,47	7,34
φ	1,71	1,68	1,41	1,41	1,29			

$$i_{01} = -3,47 \quad i_{02} = -3,05 \quad i_{03} = -2,46$$

Fig. 7

	1. Gear	2. Gear	3. Gear	4. Gear	5. Gear	6. Gear	R Gear	φ_{ges}
i	5,49	3,26	2,08	1,44	1,0	0,80	-3,91	6,69
φ	1,68	1,57	1,44	1,44	1,25			

$$i_{01} = -3,91 \quad i_{02} = -2,80 \quad i_{03} = -2,25$$

Fig. 8

3 / 3

	1. Gear	2. Gear	3. Gear	4. Gear	5. Gear	6. Gear	R Gear	φ_{ges}
i	4,84	2,98	1,90	1,41	1,0	0,77	-3,28	6,32
φ	1,62	1,57	1,35	1,41	1,30			
$i_{01} = -3,28$	$i_{02} = -2,43$	$i_{01} = -2,43$						

Fig. 9

	1. Gear	2. Gear	3. Gear	4. Gear	5. Gear	6. Gear	R Gear	φ_{ges}
i	3,87	2,48	1,74	1,38	1,0	0,76	-3,26	5,06
φ	1,56	1,43	1,27	1,38	1,31			
$i_{01} = -3,26$	$i_{02} = -2,87$	$i_{01} = -1,71$						
$i_{01} = -3,67$	$i_{02} = -2,83$	$i_{01} = -2,22$						

Fig. 10

	1. Gear	2. Gear	3. Gear	4. Gear	5. Gear	6. Gear	R Gear	φ_{ges}
i	3,83	2,30	1,62	1,30	1,0	0,79	-3,67	4,88
φ	1,67	1,42	1,25	1,30	1,27			
$i_{01} = -3,67$	$i_{02} = -2,83$	$i_{01} = -2,22$						

Fig. 11

GEAR	K1	K2	B1	B2	B3
1				\times	\times
2			\times		\times
3	\times				\times
4		\times			\times
5	\times	\times			
6		\times	\times		
R	\times			\times	
gebremstes Neutral			\times	\times	

Fig. 12

COMBINED DECLARATION AND POWER OF ATTORNEY

(Original, Design, National Stage of PCT, Supplemental)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (check one applicable item below)

original
 design
 supplemental
 National Stage of PCT
 divisional (see added page)
 continuation (see added page)
 continuation-in-part (see added page)

INVENTORSHIP IDENTIFICATION

My/our residence, post office address and citizenship is/are as stated below next to my/our name. I/We believe that the named inventor or inventors listed below is/are the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

AUTOMATIC TRANSMISSION FOR MOTOR VEHICLES

SPECIFICATION IDENTIFICATION

The specification of which: (complete (a), (b) or (c))

(a) is attached hereto.
 (b) was filed on _____ as
 Serial No. _____ or
 Express Mail No. _____ as Serial No. (not yet known) and
 was amended on _____ (if applicable).
 (c) was described and claimed in PCT International Application
 No. PCT/EP00/02337 filed on March 16, 2000 and as amended under
 PCT Article 19 on _____ (if any).
 (d) amended on _____

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name(s) and registration number(s))

Anthony G. M. Davis

Registration No. 27,868

Michael J. Bujold

Registration No. 32,018

Scott A. Daniels

Registration No. 42,462



Attached as part of this Declaration and Power of Attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

Send Correspondence to:

Davis & Bujold, P. L. L. C.
Fourth Floor
500 N. Commercial Street
Manchester, NH 03101-1151

Direct Telephone Calls to:
 (603) 624-9220Direct Telefaxes to:
 (603) 624-9229

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent Office all information which is known to be material to patentability of this application as defined in § 1.56 of Title 37 of the Code of Federal Regulations.

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

COUNTRY	APPLICATION NO.	DATE OF FILING (day,month,year)	PRIORITY CLAIMED UNDER 37 USC 119
Fed. Rep. of Germany	199 12 480.9	(22.03.99) 22. March 1999	<input checked="" type="checkbox"/> YES NO
			YES NO
			YES NO
			YES NO
			YES NO

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature(s)

Full name of solex first inventor Bülent KORKMAZ
Inventor's signature Bülent KORKMAZ Date 22. Juli 2001
Country of Citizenship Fed. Rep. of Germany
Residence Joh.-Seb.-Bach-Str. 2/1, D-78073 Bad Dürkheim, Germany
Post Office Address c/o ZF Friedrichshafen AG, D-88038 Friedrichshafen, Germany

2-10
Full name of **second** joint inventor (if any) Walter KUHN

Inventor's signature Walter Kuhn Date 20. June 2001

Country of Citizenship **Fed. Rep. of Germany**

Residence Saintisstraße 19, D-88045 Friedrichshafen, Germany DE

Post Office Address c/o ZF Friedrichshafen AG, D-88038 Friedrichshafen, Germany

3-10
Full name of **third** joint inventor (if any) Hans-Jörg DOMIAN

Inventor's signature Hans-Jörg Domian Date 01-06-15

Country of Citizenship **Fed. Rep. of Germany**

Residence Auf dem Ruhbühl 137, D-88090 Immenstaad, Germany DE

Post Office Address c/o ZF Friedrichshafen AG, D-88038 Friedrichshafen, Germany

4-10
Full name of **fourth** joint inventor (if any) Bernhard DRERUP

Inventor's signature Bernhard Drerup Date 01-06-26

Country of Citizenship **Fed. Rep. of Germany**

Residence Irisstraße 20, D-88079 Kressbronn, Germany

Post Office Address c/o ZF Friedrichshafen AG, D-88038 Friedrichshafen, Germany DE

5-10
Full name of **fifth** joint inventor (if any) Gerhard GUMPOLTSBERGER

Inventor's signature Gerhard Gumpoltsberger Date 2001-06-11

Country of Citizenship **Fed. Rep. of Germany**

Residence Saint-Dié-Str. 25, D-88045 Friedrichshafen, Germany DE

Post Office Address c/o ZF Friedrichshafen AG, D-88038 Friedrichshafen, Germany

Full name of **sixth** joint inventor (if any) _____

Inventor's signature _____ Date _____

Country of Citizenship _____

Residence _____

Post Office Address _____

Full name of **seventh** joint inventor (if any) _____

Inventor's signature _____ Date _____

Country of Citizenship _____

Residence _____

Post Office Address _____